Space Weather Forecast

Issued on Sunday 9 February 2025 at 12:58 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely throughout. Minor geomagnetic storm activity likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only Common-class flares in the last 24 hours.

Ten active regions remain on the Earth-facing disc. The majority of interest is in the northwest quadrant, with a cluster of entwined regions. The rearmost spot remains the largest and most complex region on the visible disc. The spots in the northwest have shown signs of decay in recent imagery, with their intermediate spots fading. The other regions within this cluster are close together and it is difficult to define the exact boundaries of each region. As such they are magnetically interconnected, with interaction between the various regions. The remaining regions on the disc are small and simple at present. Recent imagery suggests new sunspot regions appearing on the eastern limb.

A faint coronal mass ejection (CME) was visible leaving the Sun around 09/1130 UTC from the southeastern limb, currently awaiting further imagery for analysis but it is initially believed to be passing behind Earths orbit.

Solar Wind / Geomagnetic Activity: Solar winds were initially at slow-ambient levels around 350km/s but have begun to increase to slightly elevated levels, currently sitting around 410km/s. The Interplanetary Magnetic Field, was initially moderate, with a steady rising trend to high levels. The north-south component, was initially negative (southwards), before a steady trend to largely moderately positive. Geomagnetic activity was mainly Quiet (Kp 0-2) with a few brief Unsettled (Kp3) intervals at the start of the period.

Energetic Particles / Solar Radiation: High energy proton flux remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is likely, with a slight chance of a strong flare, initially from the cluster of regions in the northwest, soon replaced by further sunspots rotating over the eastern limb.

Solar Wind / Geomagnetic Activity: There is a slight chance of two glancing coronal mass ejections during Days 2 or 3 10-11 Feb. Solar wind speeds are expected increase in the next 24

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hours or so due to fast winds from a coronal hole, as a result, solar winds are likely to become elevated to strong. A subsequent connection to another coronal hole then forecast to follow from Day 3 (11 Feb) onwards.

Quiet to Unsettled (Kp 0-2) geomagnetic activity is likely to increase through Day 1 (09 Feb) due to a fast wind connection from a coronal hole, becoming Active to G1/Minor storm (Kp4/5) with a slight chance of G2/Moderate storm intervals (Kp6). Through the rest of the guidance period activity likely continuing at Active to G1/Minor storm levels, with the combined risk of the CME arrival on Days 2-3 (10/11 Feb and a subsequent potential connection to further fast winds from another coronal hole by Day 3-4 (11/12 Feb).

Energetic Particles / Solar Radiation: There is a slight chance of energetic particles rising above the S1/Minor radiation storm threshold as the cluster of sunspots in the northwest are now in a good position to connect with Earth, should there be further large flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	60	60	50
Strong	G3	No	5	5	10	5
Severe	G4	No	1	1	1	0
Extreme	G5	No	1	1	1	0

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	60	60	70	70
Very Active	R3-R5 (X Class)	No	10	10	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	15	15
Very Active	**≥ S3 ***	No	5	5	5	5
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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